AIR QUALITY

Project title:	**Characterization of Snowmobile Particulate Emissions**
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Objective: Snowmobile engine emissions are of concern in environmentally sensitive areas, such as Yellowstone National Park. Previous studies have investigated snowmobile engine gaseous emissions, including HC, CO, NOx, and CO_2, as well as, polycyclic aromatic hydrocarbons (PAHs). This project extended this previous research by investigating the character of snowmobile engine particulate matter (PM) emissions. Two issues were investigated. First, additional information was obtained about the chemical composition of the PM. Second, the size distribution of the PM was investigated to determine whether the particles are of respirable size. This information will help to better answer questions about potential health effects of snowmobile PM.

Findings: Gaseous emission rates from this 488 cc two-stroke Polaris engine (manufactured by Fuji Heavy Industries) agreed well with data generated on a same-model engine in a recently completed study for the Montana Department of Environmental Quality. This work confirmed that two-stroke snowmobile PM emissions are composed primarily of volatile organics, which are principally lubricant derived. Particle diameters were found to be typically less than 100 nanometers, which is of respirable size and able to be delivered into the lung. Bioassay results showed that snowmobile PM is mutagenic, at a level similar to that of PM from diesel engines.